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A PROGRAM FOR ARCHITECTURAL TECHNICIAN'S TRAINING.

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ARCHITECTURAL TECHNICIANS TRANSLATE DESIGN AND SYSTEMS SOLUTIONS INTO GRAPHIC AND WRITTEN FORM AND ASSIST IN RENDERING ARCHITECTURAL SERVICES. IN 1966, A STUDY GROUP FROM THE AMERICAN INSTITUTE OF ARCHITECTS FOUND THAT EXISTING 2-YEAR PROGRAMS WERE INADEQUATE, FALLING INTO ONE OF TWO CATEGORIES--(1) DRAFTING COURSES WHICH LACKED BREADTH AND FAILED TO PROVIDE BACKGROUND IN MATHEMATICS, APPLIED SCIENCE, AND MODERN BUILDING TECHNIQUES, OR (2) PROGRAMS SIMILAR TO THE FIRST TWO YEARS OF ORTHODOX PREPROFESSIONAL OFFERINGS, WITH INADEQUATE TECHNICAL EMPHASIS AND LITTLE PREPARATION FOR IMMEDIATE EMPLOYMENT. THE JUNIOR COLLEGE IS PARTICULARLY SUITED FOR OFFERING PROPOSED PROGRAMS IN THREE SEQUENCES--(1) DRAFTING, SPECIFICATIONS, AND ESTIMATING, (2) GRAPHIC ARTS, MODELS, AND REPRODUCTION, AND (3) ADMINISTRATION, DATA PROCESSING, AND INFORMATION. IN THIS PROGRAM DESCRIPTION, ATTENTION IS GIVEN TO CURRICULUM, STUDENTS, FACULTY, AND CONTINUING EDUCATION. (WO)

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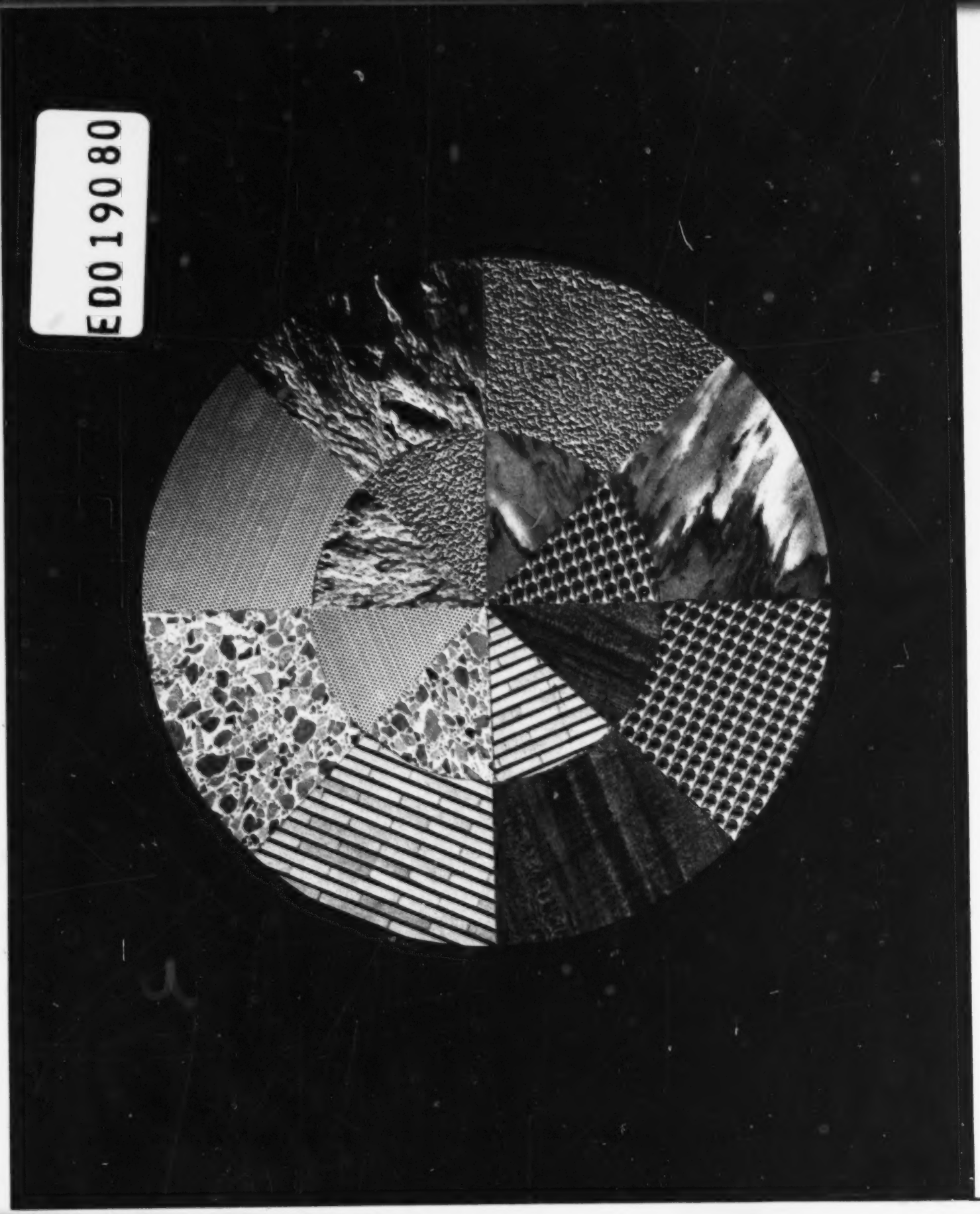

A PROGRAM FOR

Architectural Technician's Training

PREPARED BY THE EDUCATIONAL TASK FORCE FOR ARCHITECTURAL TECHNICIAN TRAINING OF THE AMERICAN INSTITUTE OF ARCHITECTS

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A PROGRAM FOR

Architectural Technician's Training

Preface

This report, representing a two-year endeavor by a task force of The American Institute of Architects, has a simple purpose: to lay the groundwork for the education of technicians who will competently serve the architectural profession in existing, emerging, and new technical roles. The findings and recommendations are set forth as an aid to the establishment of new educational programs and the improvement of existing ones.

The successful development of educational programs will depend upon the cooperative efforts of the architect, the AIA Chapter, and educator. This collaboration, already established at the national level, should be duplicated at state and community levels.

The task force acknowledges and appreciates the assistance provided by:

The Royal Institute of British Architects
The American Association of Junior Colleges
The Curriculum Laboratory of Community Colleges, North Carolina
Numerous individual schools
The education committees of the North Carolina, Southern California, and Philadelphia Chapters of the AIA

Research was made possible by a grant from The American Institute of Architects to the Department of Architectural Engineering, Pennsylvania State University, and with the cooperation of 40 architectural firms throughout the country.

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The Profession of Architecture

The selection of a career is one of life's most important decisions. It is peculiarly complicated today, involving not only an assessment of one's capabilities at a young age, but also an understanding of the modern world. Modern technology and progress have created hundreds of positions which were non-existent a few decades ago. Many ancient professions still endure, but they have become complicated and specialized.

The beginnings of architecture are lost in unwritten pages of history. Its first function was utilitarian—shelter and defense. Through the centuries, the architect's work has mirrored the advance of each age in ever increasing scope and function. Enduring examples, from the Parthenon to the U.S. Pavilion at Expo '67, express the vital contribution which a comparatively small profession has rendered.

Yesterday's architect worked primarily on a single building, relatively uncomplicated, for an individual client. Today's architect is more likely to be involved with complicated buildings which serve many purposes and with a client who is a corporation, institution, or an agency of government. Many architects are working with design concept teams, composed of engineers, planners, sociologists, economists, landscape architects and other environmental experts, to plan entire redevelopment projects or new communities. They are no longer limited to the consideration of only buildings, as they work with the team also on transportation facilities, parks, schools, and provisions of fresh air and clean water for entire urban areas.

The architect's function consists of a series of services. These are not separate actions as they form an integrated pattern. The initial effort is a statement or an analysis of the building problem and is often called programming.

Upon completion of the program, the architect obtains sufficient data to proceed with the basic or preliminary design phase. Working with his staff and a host of consultants having specialized knowledge, he develops preliminary drawings, models, cost estimates, and other necessary data. This preliminary design may undergo many changes until both architect and client are satisfied.

The ultimate instrument that fixes the design, function, and cost of a project is a set of contract drawings and specifications. The size and importance of this task require the special knowledge and abilities of many. The larger part of the resources of an architect's offices are directed toward preparing these documents which the builder will use to construct the project.

Contract drawings are a graphic representation of the whole building and its parts. Contract specifications are a complementary, written description of the type of materials, machinery, methods, and special items which the building requires and, in addition, document the legal considerations which will exist between the owner and the builder.

After a contract has been signed and work begun on the building, it becomes the architect's responsibility to administer the construction contract. He must see to it that the owner receives everything called for in the contract drawings and specifications.

The majority of architects conduct general practices and the foregoing describes their task and responsibilities.

An increasing number of architects are being attracted to related fields.

Many have become concerned with urban and associated problems and conduct practices involved in larger projects. Individual buildings within the project are often designed by others.

Hospitals, research centers, universities, and highly complicated commissions require careful analysis and programming of needs and functions before any definitive design can be undertaken. Some architects working for colleagues, government, and private clients are conducting this programming, which involves a great deal of research, interview, and computer assistance.

Our need to devise new methods of constructing and equipping buildings has given rise to another type of architect. He makes a special contribution in the science of construction, utilizing building systems, computer aids, and technological techniques. He may be working with industry, as an independent, or in association with other architects. There is sufficient evidence to believe that this will be a rapidly expanding field of practice.

Some architects have become specialists in interior design. They often will work entirely within the building frame on furniture, equipment, communications, and special problems related to the occupant's requirements. A considerable number of exhibits which are seen in museums, at fairs, and at conventions have been conceived and executed by men in this speciality.

Prophecy is not required to predict that architecture in the coming decades will experience spirited growth and will be concerned with many challenging functions and responsibilities.

Both business and industry in America have become associated with "bigness" in terms of plant and personnel. While there has been a tendency for some architectural firms to grow very large, more than half of the American architects practice with only one to four employees. Slightly less than half maintain practices with from five to 40 employees. Only three per cent employ a staff of 40 or more. While architects can be found in almost every city of 50,000 or more, the vast majority maintain their offices in, or around, the large cities. Many of our large and noted firms conduct their work in every state and around the globe.

The growth of the profession has accelerated in recent decades, but still is not large when compared with law and medicine. In 1857, upon the founding of The American Institute of Architects, there were approximately 800 in the profession. Today there are over 30,000 architects, the great majority of them belonging to the AIA.

An estimate of personnel requirements would indicate a total need of approximately 127,000 now and a replacement rate of 3,200 yearly. This number would be distributed among private practitioners, corporation departments, and public bureaus. An additional large number of architecturally trained personnel has always been found in the construction business, landscape architecture, and engineering. Two major sources of personnel will be architectural schools and institutions providing technical instruction.

The Program of the AIA

An existing and developing need for technicians within the architectural and allied professions prompted The American Institute of Architects in 1966 to appoint a task force with the responsibility of developing a program to meet these needs.

The Institute envisioned a framework for the education and training of technicians to act as guidelines for existing Technical and Junior College programs. In light of the needs of the profession, the program was to insure that the education of the student was related to his future role and responsibilities.

With a few notable exceptions, the task force found that the existing two-year educational programs in the United States were inadequate. They fell roughly into two categories.

1) The first consisted of architectural drafting courses without complementary background in mathematics, applied science, and modern building techniques. The practical phases of the student's experience were based on a few building types rather than on broad problems existing in all construction. Technical achievement was sometimes limited by attempts to teach design which requires time, a broad background, and the coordination of highly developed skills.
2) A second group of institutions adopted programs to substitute for the first two years of orthodox offerings previously required in collegiate Schools of Architecture. Technical emphasis had been diluted and the graduate who failed to matriculate for a professional degree found that he lacked the requisite training and skills for immediate and gainful employment.

The attainment of full competence cannot be achieved within the limitations of a two-year educational period. However, this time can be effective if the program is geared expressly to the needs of the profession and is followed by on-the-job training and continuing education.

The AIA program, recognizing these requirements, has specified a four-year minimum period leading to certification as an architectural technician. The first two years will be devoted to full-time learning within curricula that will form the *foundation* for current support activities existing within the profession. They also are to form the *framework* for proficiency in emerging and future activities. Programs must recognize these twin objectives and curricula must meet the recommended criteria outlined under curricula. Technology departments conforming to these standards and operating with benefit of local AIA advisory committees will be accorded letters of approval by the national AIA offices.

Immediate support for the program may be provided by a close affiliation at the local level. Most schools will be near a chapter of the AIA. An advisory committee of architects, working closely with the school, will give continuing impetus to the program, provide counsel and resources, assist in student and faculty recruitment, and provide employment and continuing in-office training. Through such an affiliation, the changes and needs of the profession will be effectively transmitted and accommodated.

The technical graduate will find initial employment at the lower levels within the professional office. Exposure and experience will confirm or correct his choice within the fields of architecture or structural, mechanical, or electrical engineering. Some will gravitate toward construction or allied manufacturing. The students who remain in architecture will be committed to a period of continuing education. The nature of this will depend upon individual aptitudes and aspirations. The special courses they take will be available in extension divisions of the university, AIA seminars, junior college night classes, and through other special auspices.

Graduation from an approved technical program, two years of architectural office experience, and the completion of courses in continuing education are the prerequisites for letters of recommendation from the technician's employer leading to certification as an architectural technician by The American Institute of Architects.

The Role of the Technician

The range of the architect's function is broad and growing, and the architectural technician may select from the same wide interest range if he has, or will acquire, the fundamental knowledge and special skills which that segment requires.

The diversity and size of architectural projects and services require a corresponding variety of supporting personnel within the office. The impact of data processing and computer aids will, in future years, create new demands.

The primary responsibility in design and planning is performed by the architect and his immediate associates. This professional level is generally occupied by licensed architects and architects-in-training who have been graduated from accredited schools.

Technological design and documentation of projects are performed by engineers and specialists. Their knowledge of other systems is gained from professional experience after being graduated from engineering colleges.

Both the professional and technologist are dependent upon a cadre of trained technicians to translate the design and systems solutions into graphic and written form and to assist in rendering architectural services. The activities in which the technician will be engaged occur to a varying degree in all areas of practice. The size of the office, its organization, and variety of services have a direct bearing on the number and type of technicians required. The following list indicates the type of technicians and representative activities which the profession requires.

Technician/Drafting
Architectural drawings
Structural drawings
Mechanical and electrical drawings
Measured drawings
As-built drawings
General purpose drafting

Technician/Estimating
Quantity take-off
Budget estimates
Cost analyses
Definitive estimates

Technician/Information
Product literature filing
Technical data acquisition
Library, books, and magazines
Literature search
Samples and materials
Information retrieval

Technician/Graphic Arts
Brochures and proposals
Reports, charts, and graphs
Displays and exhibits
Schematic drawings and diagrams
Preliminary drawings

Technician/Models
Topographic models
Study models and mock-ups
Presentation models

Technician/Specifications
Information acquisition
Outline specifications
Building descriptions
Construction specifications
Purchasing specifications

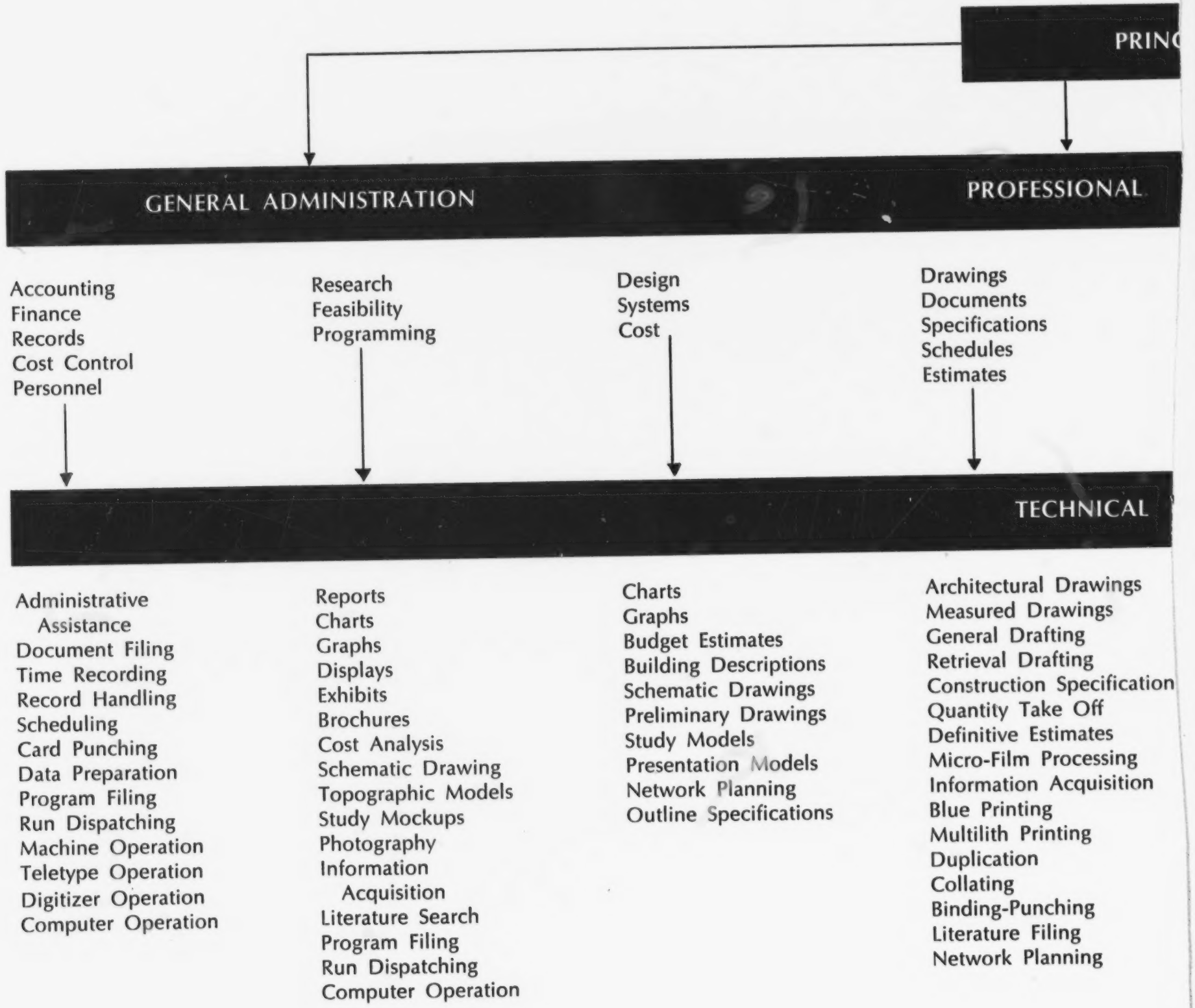
Technician/Administration
Administrative assistance
Project scheduling
Network planning
Document filing
Time recording

Technician/Data Processing
Card punching
Data preparation and record handling
Computer operation and run dispatching
Teletype operation
Digitizer operation
Program filing

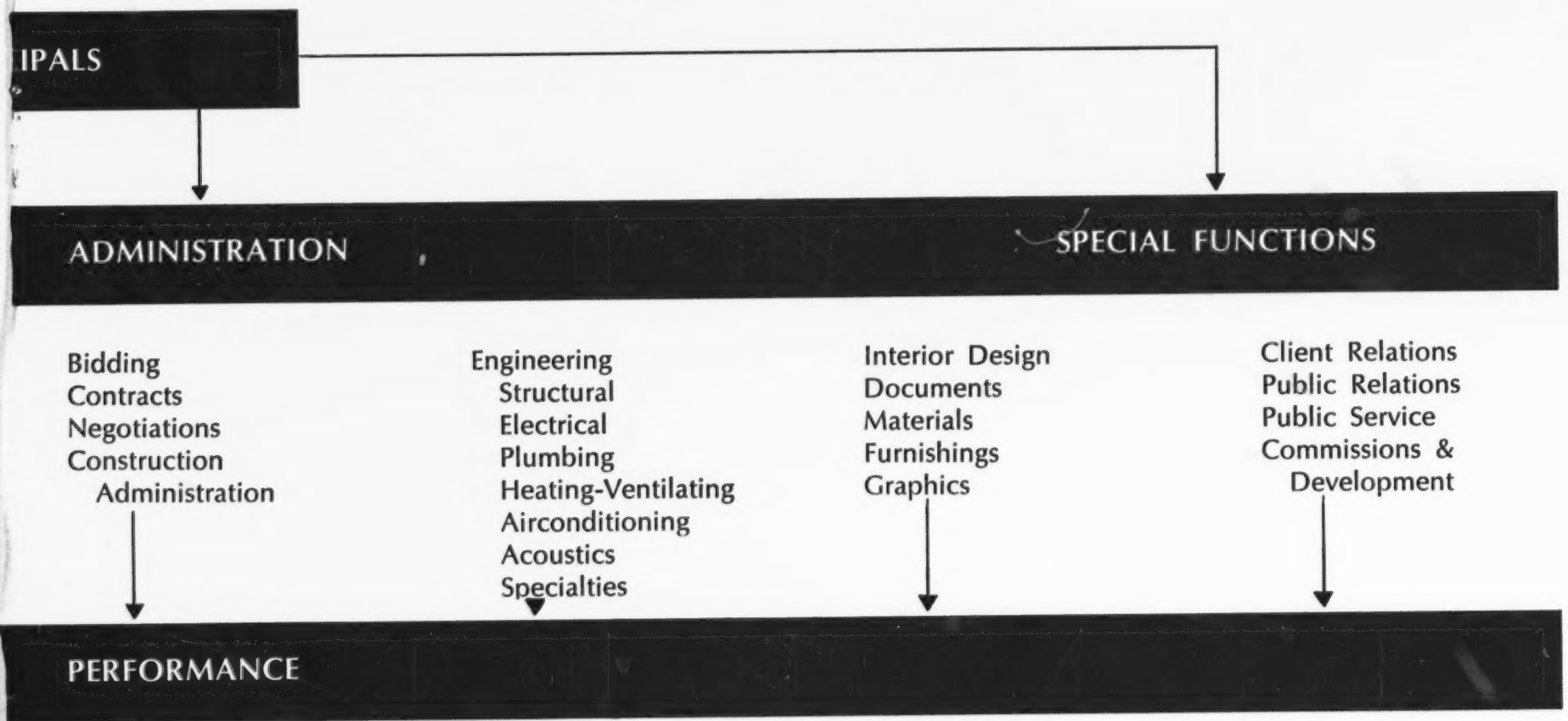
Technician/Reproductions
Blueprinting
Multilith printing
Duplication, binding, and punching
Photographic reproduction
Photography
Microfilm processing
Retrieval drafting

The technician's education should be directed toward the attainment of skills that would qualify him for several specialities. His entry into the profession may be at the most elementary level but, with experience, the competent and motivated will rise to responsible levels and be concerned with special duties.

FUNCTIONS & PERFORMANCE I



N THE ARCHITECTURAL OFFICE



The Curricula

The establishment of the technician's program is intended to mesh within the existing national educational framework. The two-year Junior, Community, or Technical College has accepted the responsibility of equipping a large segment of American youth with advanced study required for a meaningful role in twentieth century life. These institutions, located in every major area of the nation, are progressive, flexible, and already oriented toward technical training for medicine, dentistry, and many areas of business.

Nationally, it is expected that the relationship between The American Institute of Architects and the American Association of Junior Colleges will result in constant refinement and improvement of course content and curricula direction.

The education of the technician must transcend narrow vocational limits. Collegiate levels of instruction in any field must assume the obligation of developing attitudes, values, and understanding consistent with the informed citizen's role in today's society. The precise additional electives to fulfill this function are felt to be a responsibility of the individual educational institution or system.

The curricula pattern recommended is designed to educate each type of technician. The total number falls into three generic groups which must meet criteria in the area of understanding, knowledge, and skills.

1. DRAFTING, SPECIFICATIONS, ESTIMATING SEQUENCE

Understanding

- of the architectural and design professions and other components of the building industry,
- of the design and production process in architecture,
- of basic mathematics and physical factors.

Knowledge

- of building materials, systems, and construction together with the legal and practical standards affecting them.

Skills

- verbal and graphic communication associated with technical drawings and documents.

2. GRAPHIC ARTS, MODELS, REPRODUCTION SEQUENCE:

Understanding

- of the architectural and design professions and other components of the building industry,
- of the design and production process in architecture,
- of basic mathematics.

Knowledge

- of visual and graphic communication and interpretation of technical drawing and instruction.

Skills

- layout and production of two and three dimensional models and charts,
- operation of reproduction techniques.

3. ADMINISTRATION, DATA PROCESSING, INFORMATION SEQUENCE

Understanding

- of the architectural and design professions and business organization and procedure,
- of business and data processing mathematics.

Knowledge

- of the language, programming, and potentials of the computer, data processing, and information systems.

Skills

- operation of machines, computers, and devices in contemporary business and architectural practice.

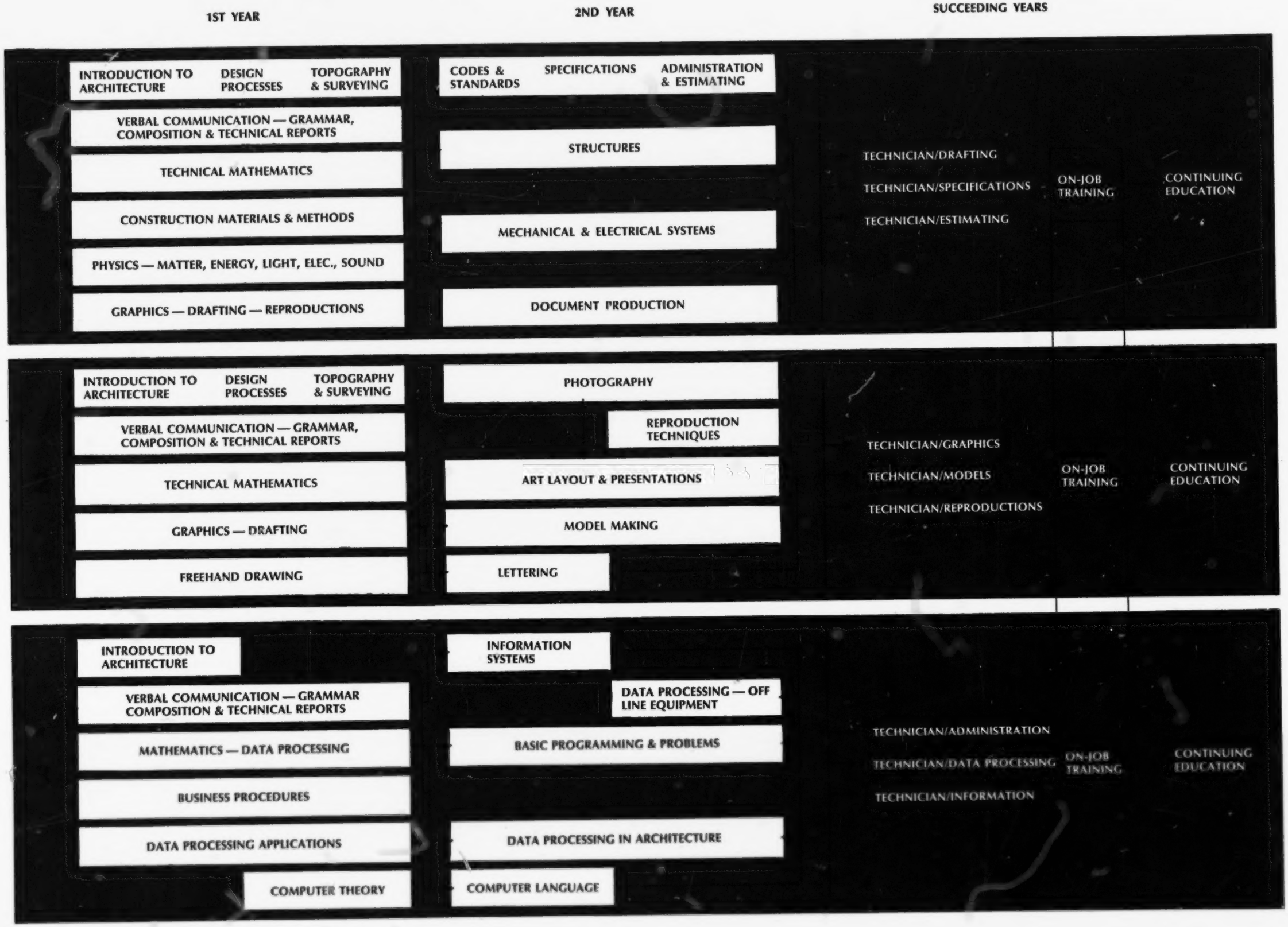
This criteria, established successful programs, and research findings have governed the selection of the recommended curricula pattern. There are practical and desirable reasons for its general format.

The existing two-year college systems are constructed on both the semester and quarter system. For this reason, courses are not specified in such terms. Certain offerings may have to be combined or divided to suit the applicable system.

Relationship of courses and continuity of learning experiences are considered important and are indicated on the curricula chart. Precise content of courses and an assessment of credits are not detailed. This is considered to be a prerogative of the individual school or system. Emphasis and interpretation may vary according to local, regional, or special needs and limitations.

Certain institutions will wish to initiate and develop all of their own programs within the recommendations and parameters set forth. This is natural and desirable under optimum conditions. Restrictions in time, staff, and resources will require many schools to profit from the experience of others. The bibliography in this text contains a list of available data. A course outline, supplement to this program, developed by AIA and reviewed by educational counsel, will be available as a supplement.

Curricula Pattern



The Student

The performance of architectural services and participation in the profession of architecture require unique traits and capabilities. The standards set forth by The American Institute of Architects impose direct obligations on the architect and indirectly on his employees and colleagues. These standards broadly require that one contribute to the profession's maximum social usefulness, improve his own competence, and insure the future of the profession through active participation in its affairs. Such responsibilities require indispensable qualities in the student who anticipates a career in architecture.

The successful student in this program must be intelligent and motivated and possess an inherent mathematical, artistic, or manual skill. He will be conscious of both the obligations and the rewards of this career and must be willing to invest in the time, study, and self-development which are required.

The prerequisites for enrollment in the technician's program should be a high school diploma indicating successful completion of the following:

- Mathematics covering the fields of algebra, plane geometry, and trigonometry.
- English
- History or social studies
- Physical Science

Qualified students not meeting these prerequisites will require developmental instruction in the deficiencies.

Students entering the architectural administration option should have some record of applied office practice subjects. Students selecting drafting or graphic arts options will have profited from courses in art or drafting.

An unrecognized but important source of student recruitment exists within the colleges. Large numbers of students following unspecified, general educational paths may be attracted to this program. Experience indicates that the mature, dedicated student exhibits rapid progress within school and facile adjustment to employment.

Testing and counseling are important tools for directing student development and maximizing educational and human resources. These counseling activities should begin in the secondary school environment and be carried on throughout the student's subsequent educational program. The results of this procedure can prevent matriculation by the unqualified, permit discretion in mandatory requirements, and uncover hidden potential. Students with superior scholastic aptitude and promise should consider professional education leading to a bachelor's degree. In these instances a course of study should be followed which will be transferable to an accredited school of architecture or engineering.

The Faculty

The quality of education in architectural technology will be affected more by the faculty than any other single element. It is evident also that problems confront every institution in attaining a knowledgeable and effective staff.

The nationwide shortage of qualified teachers is an acknowledged fact. It is especially critical in the area of specialized technical instructors. The small number of architectural graduates who select teaching as a career are invariably associated with the professional schools of architecture. No school or department of education presently is training graduates who can qualify for the positions which the architectural technician's program requires.

The recommended curricula contain offerings in English, mathematics, science, business, and social study electives. These subjects will draw instructors from established departments. The bulk of the offerings in this program, however,requires a staff which has been schooled in, or is conversant with, special areas.

The initial problem of recruitment and development of faculty will require a combination of approaches, relaxation of some arbitrary requirements, and considerable ingenuity.

The profession itself is an obvious and prime source for visiting lecturers and part-time instructors. Younger practitioners often are interested in part-time teaching until their practices are firmly established. An additional, unsolicited group exists within the profession which has the aptitude and inclination to teach, but never has received an invitation. This group is generally experienced and is in the ranks of so-called "middle management." They may not be licensed architects, but are invariably competent in the techniques of production and drafting which form an important part of the curricula. Another available source is the Chartered Surveyors, who in Canada and Great Britain perform the function of quantity surveying, costing, and special services associated with construction. They are eminently qualified to teach materials, specifications, standards, construction administration, and estimating.

Several unique and realistic solutions have been developed in other countries faced with similar problems. One was the development of a Technical Teaching Institute with the sole mandate of training prospective teachers within a nine-month consecutive period of two split periods accommodated to the semester terms. Only candidates over the age of 25 with suitable technical qualifications and experience are considered.

A second approach has been the concept of intensive and specialized lectures and tutoring. A man of recognized ability works with prospective faculty members, part-time and evenings as well as full-time, in order to bring them to a satisfactory level of proficiency and development.

It would be feasible for each community college or system to consider developing a "do-it-yourself" program of teacher training. The summer period immediately prior to initial appointment is an ideal time for basic orientation and training. Evaluation and advanced instruction could be accommodated in evenings throughout the teaching year.

A practical, tested solution exists in many universities today. Institutes for special study and/or research have been established under joint auspices with private business. Business firms in association with this program have released their officers and key employees for both teaching and learning on a part-time basis with mutually satisfactory results.

Irrespective of the means employed to obtain and train faculty, it is axiomatic that the successful teacher will have the background and experience to command respect and will maintain a close and active relationship with the profession so that its progress and changes will be manifested in his teaching.

The Facilities

The physical requirements of the program are not unique, but must be ample. Almost all subjects lend themselves to the average classroom situation. Mathematics, physics, English, and elective offerings will be taught probably within rooms regularly assigned for these subjects.

Instruction in construction materials, codes, specifications, structures, and mechanical and electrical systems will depend upon exhibits, audio-visual aids, technical reference, and examples and can be scheduled in the drafting laboratories. Testing equipment to demonstrate the composition and behavior of materials is desirable.

The drafting or production laboratory should be designed and equipped as a professional space with tables, storage, and equipment for each student. The student should have free access to this space during extended hours due to the extra time required for assignments. The laboratory should contain copies of reference texts, construction codes, building material catalogs, illustration of standards, symbols, and examples of documents and drawings. The preferred instruments for drafting are presently parallel rules and triangles. In the near future it is expected that light versatile printers, graphic plotters, and other machines will become ordinary tools for the technician's use. Students in this room should have easy access to reproduction machines. Room size will be contingent upon teacher-student ratios. An average space allocation of 40 square feet per student is recommended.

A multi-purpose laboratory is required for graphic art, model making, and photography. The latter speciality will require adjacent dark rooms and space for enlarging equipment, mounting, and micro techniques. Storage of material, projects, and special power equipment for model-making also may be located immediately adjacent. Large, flat, hard-surfaced work tables will be used for most work and can be shared by up to four students. The room will contain sinks and painting areas with adequate ventilation. An area allocation of 40 square feet per student should be provided exclusive of ancillary spaces.

A room for reproducing materials must be located conveniently for all students' use as well as special instruction. This space will house dry process printers capable of producing opaque prints, transparencies on paper and sheet plastic and transparent decals. Other equipment will include photocopy machines, multilith or similar duplicators, collating and binding equipment. Special ventilation is required due to heat and fumes.

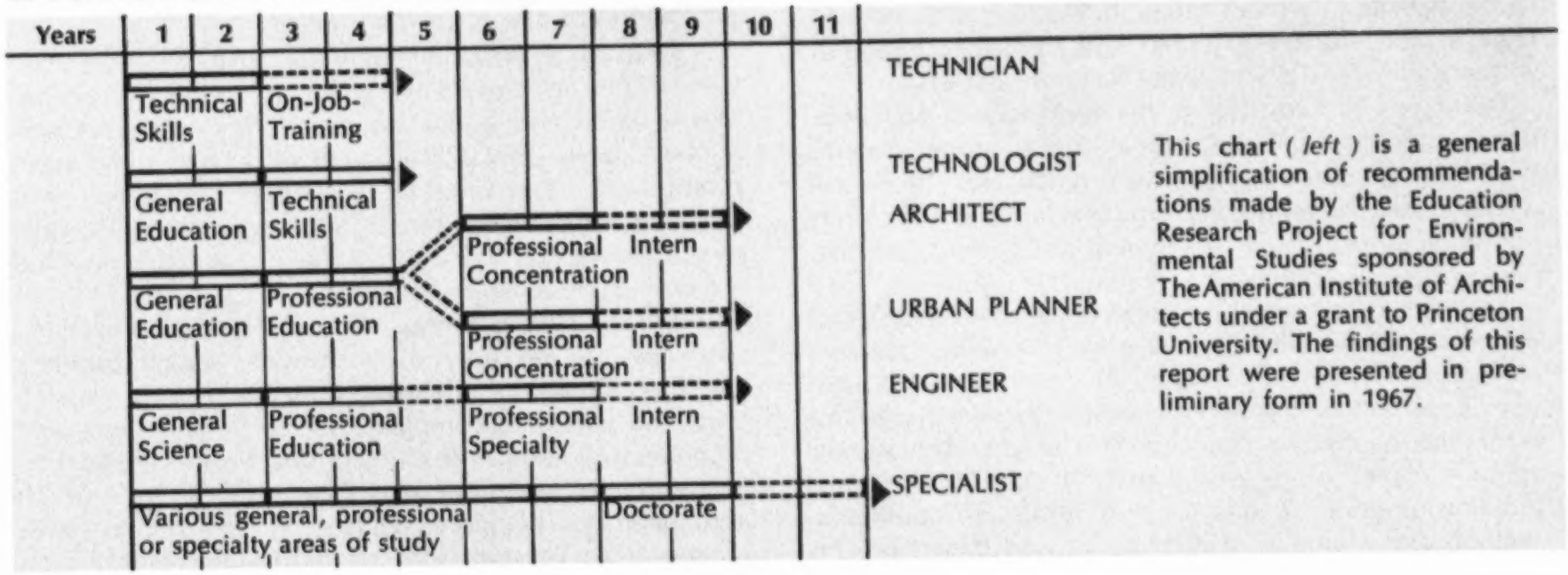
The facilities for students following the data processing sequence will be fully invested with typical business machines found in offices—automatic data processing units and access to computers scaled to operations and programs associated with conventional business, engineering, and technical functions. The rapidity with which automated and computer devices are affecting business requires flexibility and expansion in this important facility.

A source library within the department is highly desirable for both student and faculty use. In addition to special reference books and slides, it would contain drawings, specifications, quantity surveys, contracts, and other documents from architectural and engineering offices. Up-to-date construction specification catalog files may be maintained and, ultimately, tapes, cards, and programs for data retrieval, programming, scheduling, and similar use will be housed.

Classroom instruction should be augmented by field exposure and office visits in almost all technical subjects. Instruction in construction materials, systems, and structures especially will profit from trips to manufacturing plants and construction sites. Student contact with real operations and procedures is initially and continually a valuable and necessary adjunct to formal instruction.

Appendix

EDUCATION FOR ARCHITECTURE A general pattern



This chart (*left*) is a general simplification of recommendations made by the Education Research Project for Environmental Studies sponsored by The American Institute of Architects under a grant to Princeton University. The findings of this report were presented in preliminary form in 1967.

CONTINUING EDUCATION FOR THE ARCHITECTURAL TECHNICIAN

A List of Suggested Courses

for the Technician/Graphic Arts-Models-Reproductions

Color Theory
Advanced Photography
Technical Illustration
Commercial Illustration
Architectural Delineation
Advanced Model Making

for the Technician/Drafting-Specifications-Estimating

Advanced Specifications
Advanced Cost Estimating
Construction Supervision
PERT Scheduling
Mechanical Systems
Electrical Systems
Illumination
Acoustics

for the Technician/Administration-Data Processing-Information

Office Management
Cost Control
Business Law
Network Planning
PERT Scheduling
Advanced Programming

Bibliography

American Institute of Architects. Commission for the Survey of Education and Registration. *The Architect at Mid-Century; Report*. New York, Reinhold Publishing Co., 1954. Vol. 1.

"Career Information for Use in Guidance." U.S. Bureau of Labor Statistics. *Occupational Handbook; Employment Information on Occupations for Use in Guidance*. Washington, D.C., Government Printing Office, 1965.

Chamber of Commerce of the U. S. A. Task Force on Economic Growth and Opportunity. *The Disadvantaged Poor, Education and Employment*. Washington, D. C., 1966.

Colchester, T. C. "Current Trends in the Education and Organization of Architectural Technicians." Commonwealth Association of Architects. *Handbook of Commonwealth Architects, 1967. p. 51-52.*

The Encyclopedia of Careers and Vocational Guidance. New York, Doubleday and Co., 1967. Vol. 1, Planning Your Career; vol. 2, Careers and Occupations.

Engineers Council for Professional Development. *Technician Career Opportunities in Engineering Technology*. New York (n. d.)

Geddes, Robert L. and Bernard P. Spring. *A Study of Education for Environmental Design*, sponsored by The American Institute of Architects. (n. p.) 1967.

Institute for the Certification of Engineering Technicians. *The Certification of Engineering Technicians*. Washington, D. C., 1967.

Massachusetts Institute of Technology. *Report of the Summer Study on Occupational, Vocational and Technical Education*. Cambridge, Mass., 1965.

Murphy, James M., Comp. *Directory of Vocational Training Sources*. Chicago, Science Research Associates, Inc., 1964.

National Association of Secondary School Principals. *Educating for Work*. Washington, D. C., 1967.

National Council of Technical Schools. *Engineering Technology Careers*. Washington, D. C., 1966. (Publication no. 1065)

Peters, Herman J. and J. C. Hansen, Editors. *Vocational Guidance and Career Development; Selected Readings*. New York, Macmillan Co., 1966.

"Quantity Surveying Section." *Rules and Syllabus for Professional Examinations*. London, Royal Institution of Chartered Surveyors, 1961.

Royal Institute of British Architects and Society of Architectural and Associated Technicians. *A Career as an Architectural Technician*. London (n. d.)

Royal Institute of British Architects and Society of Architectural and Associated Technicians. *Syllabus for Higher National Certificates and Diplomas in Building*. London, 1967.

Royal Institution of Chartered Surveyors. *History and Scope of the Profession of Surveying*. London, 1964.

Society of Architectural and Associated Technicians. *Two Policy Committee Statements*. London, 1967.

Society of Architectural and Engineering Technologists of British Columbia. *Education Bulletin and Schedule of Examinations*. Vancouver, 1966.

Society of Architectural and Engineering Technologists of British Columbia. *Membership Information Bulletin*. Vancouver, 1966.

Technician Education Yearbook, 1963-64. Ann Arbor, Mich., Prakken Publications, Inc., 1964.

Technician Education Yearbook, 1965-66. Ann Arbor, Mich., Prakken Publications, Inc., 1965.

"The Technician's Training, Role, Status." *AIA Journal*, 48(6): 78, 80, Dec. 1967.

U.S. Bureau of Labor Statistics. *National Survey of Professional, Administrative, Technical, and Clerical Pay*, Feb.-Mar. 1966, Washington, D. C., Government Printing Office, 1966 (*Bulletin*, 1535).

U.S. Department of Labor. *Manpower Report of the President and Report on Manpower Requirements, Resources, Utilization, and Training by Department of Labor, Transmitted to Congress Mar. 1966*. Washington, D. C., Government Printing Office, 1966.

U.S. Office of Education. *Chemical Technology; Suggested 2-Year Post High School Curriculum (prepared by Walter J. Brooking and others)*. Washington, D. C., Government Printing Office, 1964 (Technical Education Program Series, no. 5).

U.S. Office of Education. *Civil Technology, Highway and Structural Options; Suggested 2-Year Post High School Curriculum (prepared by Walter J. Brooking and others)*. Washington, D. C., Government Printing Office, 1966. (Technical Education Program Series, no. 8).

U.S. Office of Education. *Electron Technology; Suggested 2-Year Post High School Curriculum*. Washington, D. C., Government Printing Office, 1966 (Technical Education Program Series, no. 2A).

U.S. Office of Education. *Mechanical Technology, Design and Production; Suggested 2-Year Post High School Curriculum*. Washington, D. C., 1962 (Technical Education Program Series, no. 3).

Venn, Grant and T. J. Marchese. *Man, Education and Work; Postsecondary Vocational and Technical Education*. Washington, D. C., American Council on Education, 1964.

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